Mr. Ernest Papendiek exhibited a specimen of the European *Silpha atrata*, one of twenty specimens taken from the dead body of a toad in Milton, Mass.

Dr. H. Hagen remarked that Prof. Ratzeburg had recently stated, in a letter to him, that he had carefully studied "Ichneumonosis," or the prevalence of hymenopterous parasitism, in the insects injurious to forest trees, and found that for many years it had carried off ten per cent. of the number of such insects. In 1867 and 1868, years in which the forests had suffered unusually from obnoxious insects, this ratio had been reduced to between one and two per cent., while, at the same time, "Mycetinosis," or the prevalence of fungoid parasitism, had increased to between forty and fifty per cent.; a balance of destructive power seemed to be always maintained between the two forms of parasitism. Mycetinosis had especially checked the ravages of the very destructive caterpillar of *Bombyx pini*.

April 7, 1869.

Vice President Mr. T. T. Bouvé in the chair. Twenty-four members present.

Mr. William Foster of Brookline and Mr. Henry Cutter of Boston were elected Resident Members.

On behalf of the author, the Secretary presented the following paper:—

On New and Imperfectly Known Echinoderms and Corals. By A. E. Verrill.

ECHINOIDEA.

Agassizia subrotunda Gray.

Catalogue of recent Echinida of the British Museum, p. 63, pl. III, fig. 2, 1855.

Two specimens collected at La Paz, Gulf of California, by Capt. J. Pedersen, agree perfectly with Gray's description and figure of

this species. The larger one has almost exactly the same size and outline as the specimen figured. It is therefore probable that the locality given ("Australia?") is erroneous.

Perhaps *A. oculum* Lütk, is only the young of this species, although more oblong in form.

The larger specimen is 1.70 inches long; 1.55 broad; 1.25 high. The smaller one 1.50 long; 1.35 broad; 1.05 high.

Brissus obesus Verrill.

Transactions Connecticut Academy, Vol. I, p. 316, 1867.

A larger specimen, with part of its spines, has been received from Capt. Pedersen, collected at La Paz. It agrees well in form and other characters with the original specimens. The spines are silvery white and slender, on the upper side decreasing regularly in length from the peripetalous fasciole to the margin; the upper ones being .10 or .12 long, the lower ones .25 to .28. Those near the margin beneath are quite long, .35 to .38, those near the mouth largest. This specimen is 2.65 inches long; 2 broad; 1.40 high.

Desoria nodosa Verrill, sp. nov.

Irregularly broad oval, subangulated; the anterior end deeply emarginate; the posterior truncate, slightly oblique, a little concave below the anal area. On each of the four, lateral, interambulacral regions of the upper surface are two radiating series of distant, slightly elevated, nodular elevations or ridges, which give the surface an irregular appearance, and by their continuation downward to the lower surface, give a somewhat angular appearance to the margin.

Posterior interambulacrum elevated in the middle, with a series of three or four slightly raised nodes. Tubercles of the upper surface small and nearly uniform, except on each side of the anterior ambulacral furrow, where there are several irregular rows of larger ones, about equal in size to those near the margin on the lower surface. Anterior ambulacrum considerably depressed, with a row of double pores on each side, which extend to the mouth. Anterior lateral ambulacra more sunken, narrow, elongate, the end curved forward; posterior lateral ambulacra scarcely shorter, narrow, elongated, the outer ends considerably curved and divergent, the inner portion suddenly narrowed, and with minute pores, as in the anterior pair. Ovarial openings four, rather large, the posterior pair a little larger and farther apart, the madreporic plate extending between them. Peripetalous fasciole angular and sinuous, each angle situated on one of the prominences or nodes in the interambulacra. In the posterior inter-

ambulacrum the bend of the fasciole extends inward only one sixth of the length of the posterior ambulacral furrows, and in the lateral interambulacra it extends inward less than half the length, and then forming an obtuse angle, passes obliquely downward and across the interambulacral region in a straight line, for nearly half an inch, to another angle near the margin of the anterior lateral ambulacra, from whence it passes outward for .1 of an inch, diverging a little from the furrow, to another angle where it joins the lateral fasciole. From this angle it approaches the furrow again in a slightly curved line, passing around and close to its end. In the anterior lateral interambulacra it forms but one broad round angle, at about three tenths the distance between the end of the anterior lateral furrows and the centre. The lateral fasciole is somewhat sinuous, passing under the anal area in a broad curve. Anal area broad, elliptical, higher than broad, situated toward the upper part of the truncated posterior end, its plane nearly perpendicular to the lower surface. Plastron broad shield-shaped, only slightly narrowed behind.

Length 2.10; breadth 1.95; height 1.45; from apex to anterior margin, in ambulacral furrow, 1.10; apex to posterior margin, at anal area, 1.70; apex to end of anterior lateral ambulacral furrows .1; to end of posterior lateral .95; apex to inner angle of the fasciole in the anterior interambulacra .70; to inner angle in lateral interambulacra .55; to same in posterior interambulacrum .73; breadth of anal area .24; height .36; length of plastron 1.55; breadth .95.

Locality unknown.

This species agrees well with *D. australis* Gray, the type of the genus, but shows good specific differences in its more angulated form, more emarginate anteriorly; in its less eccentric apex; in its broader plastron, much less narrowed posteriorly; in its more squarely truncate and less oblique posterior, and larger and less ventral position of the anal area; and especially in the form of the peripetalous fasciole, which does not extend nearly so far toward the centre in the interambulacral regions.

Mellita longifissa Michelin.

Since the publication of my "Notes on the Echinoderms of Panama and West Coast of America," I have seen quite a number of specimens of this species, which was then unknown to me. These are from La Paz, Capt. Pedersen; Gulf of California, Robt. E. C. Stearns; Acajutla (Corinto), McNiel.

This species is the Pacific analogue of *M. pentapora* of the Atlantic

coast. It is remarkable for the thinness or flatness of the outer portion of its shell, the deeply sunken grooves of the lower surface, and the length and narrowness of its five perforations, and especially of the odd posterior one. The posterior side is somewhat truncate, but a little rounded in the middle, and the posterior lateral perforations are curved. The largest specimen from Gulf of California (Stearns) is 3.8 inches in diameter; another is 2.95 wide, 2.70 long, .45 high; the anterior pair of perforations .54 and .56 long; the posterior pair .55 and .60; the posterior odd one .78 long; .09 wide.

Scaphechinus mirabilis (Barnard MS.) A. Agassiz.

Proc. Philad. Acad. Nat. Sci., 1863, p. 359.

Two specimens of this species, received from Robt. E. C. Stearns, Esq., are from Yokohaina, Japan.

Echinarachnius asiaticus Mich., Rev. and Mag. Zoöl., 1859.

A specimen, apparently of this species, collected at the Aleutian Islands, by W. G. W. Harford, on the U. S. Coast Survey, has been received from Mr. Stearns.

It differs from *E. parma*, of the New England coast, in having a thicker form, especially toward the margin, and much broader and more open ambulacral rosettes.

Tripneustes depressus A. Agassiz.

Verrill, Trans. Conn. Acad., I, p. 375, 1868.

Capt. Pedersen has sent several more large and fine specimens of this species, collected at La Paz. The largest specimen is 5.15 inches in diameter, and 2.60 high.

They agree well with the one previously described, except that one specimen has much larger ovarial plates than the others, and consequently a larger abactinal region. The ovarial plates are also more pointed, giving the abactinal area a more stellate form. The difference is possibly sexual.

ASTERIOIDEA.

Gymnasteria spinosa Gray.

Annals and Mag. Nat. Hist., 1840, p. 278; Synopsis of Species of Starfishes in British Museum, p. 8, 1866.

A starfish sent from La Paz, by Capt. Pedersen, seems to be identical with this species, originally collected at Panama by Mr. H. Cuming.

Form pentagonal, with rather broad, tapering, somewhat depressed, triangular rays. Radii as 1:2.2. The skeleton, both above and

below, consists of moderately large, rounded and polygonal plates, joined by their edges, so as to leave small spaces between, with their surface roughened by very small, granule-like prominences, and covered with a thin membranous skin, which allows the roughness of the plates to show through it. The dorsal plates on each ray are stout, rather rhomboidal, and bear a row of eight or ten stout, elevated, blunt spines. The sides of the rays are formed by about four series of plates, near the base, in the two median rows rounded, in the upper and lower ones with lateral prolongations, which articulate with the dorsal and marginal plates in such a way as to leave rather large openings between, marginal plates stout, prominent, projecting laterally, and rounded on the outer side, much broader than high, alternating in two rows, about twelve on each side of the ray, each one bearing a stout, elongated, subconical spine. Plates of the lower side rounded and subpolygonal, unequal, some of them bearing a very small central tubercle. Each interambulacral plate bears an outer, stout, oblong spine, compressed or wedge-shaped at the tip, and an inner group of five slender ones, of which the two lateral are very short, and the middle one considerably longest, all connected together by a thin web. On each margin of the mouth there is a group of five, rather slender, subequal spines connected together by a web. Near the margin of disk and rays, above and below, there are many rather large pedicelariæ, oblong or subcylindrical in form, obtuse at tips.

The dried specimen is light red above, yellowish below.

Radius of disk .68 inch; of rays 1.50; length of dorsal and marginal spines .10 or .12; diameter .05 or .06; diameter of upper and lower plates .05 to .10, mostly about .08.

Acanthaster Ellisii nob.

Echinaster Ellisii Gray, Annals Nat. Hist., 1840, p. 281; Synopsis, Starfishes of British Museum, p. 12, 1866.

Acanthaster solaris (*pars*) Duj. et Hupé, Hist. nat des Zooph. Ech., p. 352, 1862.

A small thirteen-rayed specimen, received from Capt. Pedersen, who collected it at La Paz, appears to belong to this rare species. The spines are long (.15 inch) and quite slender. The diameter is 1.5 inches; length of rays .40.

There are five madreporic plates, which are small, round and prominent. The plates of the lower surface between the spines are granulated, the granules extending over the rays and on the upper part of the margin. Color light red, the upper spines rose-red;

those below pink with white tips; the general color of the lower surface yellowish white.

Echinaster spinulosus Verrill, sp. nov.

A species with five long, tapering rays, covered with very numerous, small, blunt spines, arranged in many rows.

The rays are slender, elongated and regularly rounded, gradually tapering. Radius of disk to that of rays about as 1:4.5. Spines of the upper surface small and very numerous, short, mostly blunt, arranged in many somewhat irregular rows, two or three often grouped together upon one plate, the whole number in each row being forty or more. The whole number of rows, above and below, exclusive of those near the grooves, varies according to the age, from fifteen to twenty-one or more. The interambulacral plates bear an inner very small and slender spine, and outside of this two much larger ones, similar to those of the upper surface, one being placed farther back than the other, so as to form two alternating rows. Outside of these there is a row of similar spines, which are somewhat appressed to the surface and point toward the margin of the ray. The plates of the upper surface are prominent and finely granulated. A medium sized specimen measures from centre to edge of disk .45 inch; to end of rays 2.10; length of dorsal spines .02 to .03. The largest specimens are about six inches in diameter.

Egmont Key, west coast of Florida, common; E. Jewett.

This species is more nearly allied to *E. multispina* Gray (sp.) (*E. Braziliensis* M. and Tr.) than to the other Atlantic species. The latter differs, however, in having fewer rows of spines (nine to eleven), while the spines themselves are larger, more conical, and acute. The rays, also, as described by Gray, are "short, depressed, broad, rather more than twice as long as the width of the body, blunt at the end," but in this species they are long, round and tapering, the form being quite constant in more than one hundred specimens, which are in the collection.

E. spinosus, from the Florida Reefs and the West Indies, differs in its much stouter form, with shorter and much larger rays, and very much larger and fewer, sharp spines, which form only about ten or twelve longitudinal rows, with about twelve or fifteen spines in each row.

Pteraster Danæ Verrill, sp. nov.

Upper surface moderately convex; radius of disk to that of rays as 1:1.18; rays broad, subtriangular, the tips recurved so as to expose

the end of the ambulacral grooves on the upper side. The dorsal membrane is perforated by minute scattered pores, and numerous small, slender, acute spines project from its surface at regular intervals; these are larger on the disk and quite small on the outer part of the rays. Central opening small, somewhat rounded, surrounded by small spines. Dorsal paxillæ, as seen when the dorsal membrane is removed, elevated and rather stout, surmounted at the summit by six to ten, slender, acicular, divergent spinules, one of which is usually larger, and projects through the membrane. Rays beneath bordered on each side by about thirty slender, transverse, spine-like ribs, which project but slightly beyond the margin, and are connected by the web-like membrane quite to their ends. Interambulacral plates thin, each bearing usually four very slender, elongated spines, many of them with small pedicellariæ near the tips; the inner one considerably shortest; all connected together by a web, which retreats between the points to a considerable extent; near the mouth there are often five spines. At each interradial corner of the mouth there are ten long, slender, pointed spines, the six middle ones about equal in length, the two outer ones on each side much smaller, the outermost considerably smaller than the preceding; just back of these, and side by side, are two long, slender, somewhat curved, acute spines, about equal in length to the longer ones of the group in front of them.

Radius of disk .37 inch; of rays .57; width of rays at base .50; elevation of back .35; length of longest transverse ribs of the rays beneath .15; of interambulacral spines .06 to .08; of the spines at mouth angles, about .08.

Rio Janeiro (?); J. D. Dana, U. S. Expl. Expedition.

Heliaster Kubiniji Xantus.

Proceedings Phil. Acad. Nat. Sciences, 1860, p. 568; Verrill, Trans. Conn. Acad., I, p. 292, 1867.

Capt. Pedersen has sent one good specimen of this rare species, obtained at La Paz. It has twenty-three rays, and is eight inches in diameter; the rays are 1.5 to 2 inches long; the disk six inches broad.

On the upper side the rays, especially near the end, are thickly covered with small oval pedicellariæ, mixed with other very minute ones of similar form.

OPHIUROIDEA.

Astrophyton panamense Verrill, op. cit., p. 251.

Three large specimens of this species, previously known only from

Panama, and Zorritos, Peru, have been collected at La Paz, by Capt. Pedersen. They occurred, as usual, adhering firmly to the branches of *Muricea*.

The largest specimen has a disk three inches in diameter.

Astrophyton Stimpsonii Verrill, sp. nov.

A large species allied to *A. Lamarckii*, with crowded, large, rounded granules on the ribs and arms, larger scattered ones on the disk between the ribs, and smaller scattered ones on the interradial spaces below.

The ten ribs are long and narrow, nearly equidistant, extending to very near the centre, narrowed at the inner end, and but slightly enlarged close to the outer end, entirely covered with crowded, large, prominent, round-topped grains; a border of similar grains surrounds the edge of the disk, connecting with those at the end of the ribs. Centre of disk crowdedly covered with similar granules; the spaces between the ribs with distant, unequal, larger, round grains, or small tubercles, irregularly grouped. Region around the mouth and lower side of arms smooth; interradial regions with scattered, round granules, smaller than those on the ribs, upper side of arms covered throughout with closely crowded, prominent, rounded granules, a little smaller than those on the ribs. Arm-spines, between the first and second fork of the arms, in groups of four or five, subequal, short, obtusely pointed; between the second and third forks, in groups of five or six, nearly equal.

Color of the dry specimen brownish yellow; lower side of disk and arms reddish brown.

Diameter of disk 3.10 inches; length of ribs 1.50; breadth at middle .20; diameter of rib granules .03 to .04; of largest disk granules .05; radius from centre of mouth to first division of the arms 1.35; to second fork 1.70; subsequent forkings at irregular distances.

Ochotsk Sea; Robt. E. C. Stearns, 1867.

A smaller specimen with the disk 1.25 inches in diameter, is in the collection of the Chicago Academy. It was collected by the North Pacific Exploring Expedition in the Arctic Ocean, north of Behring's Straits. The central part of the disk is less granulous, and the spaces between the mouth and interbrachial areas are finely granulose. Outside the genital openings are from three to six prominent, sharp grains.

Ophiarachna maculata Verrill, sp. nov.

A large yellowish brown species, with stout arms, finely spotted with darker on the upper surface.

Radius of disk to that of arms as 1 : 9 or 10.

Disk large and thick, the interradial regions swollen and a smaller lobe bordering each side of the arms at base; upper surface and interradial spaces below covered throughout with small, closely crowded, rounded or slightly polygonal granules; radial shields not visible; at the base of each arm a few naked, imbricated, unequal scales. Mouth-shields broad-cordate, broader than long, the inner end obtusely rounded, the sides slightly incurved, the broad outer end emarginate. The accessory plates outside the mouth-shields either two and nearly equal, or three and unequal, in the same specimen; when there are two they form together a narrow, slightly oblong ellipse, much narrower than the mouth–shields; when there are three, the middle one has a broad, rounded triangular form, and the two lateral pieces are small, unequal, and irregular in size and form. Mouth-papillæ seven or eight on each side of the mouth, the inner one elongated, irregularly oval, somewhat pointed; the next much larger than the others, broader than long, somewhat quadrilateral and irregular, the outer edge narrower and flattened; the third a little longer than the first, irregular in form, somewhat pointed at each end; the three or four following are a little smaller, and about equal in size and similar in form, rather oblong, somewhat irregular and wedge shaped, the outer edge being flattened, those toward the centre a little shorter; these are frequently followed by a small rounded one, which is sometimes wanting; the last one is short and rounded. The narrow space between the mouth-papillæ and mouth-shields is covered with small rounded granules, except about opposite the first, where the side shields are partly exposed. The teeth have been much injured, but there appear to be five, which are stout, broad, the lower ones somewhat squarish, with rounded angles when seen from above, the end flattened or wedge-shaped, truncate or bevelled. The arms are well rounded, stout at base, regularly tapering to the ends, but not becoming slender. Under arm-plates eight sided, slightly overlapping, the first eight or ten broader than long, followed by a number that are as long as broad, the length gradually increasing, so that at the twenty-fifth plate the length is decidedly greater than the breadth. Inner tentacle-scales oblong, shorter than the arm-plates, toward the disk very broad and stout, truncate, farther out gradually becoming more slender and pointed; outer tentacle-scale very short and broad, about half as long as the inner; those at the base of arms broader than long, the inner side and outer end nearly rec-

tilinear, the articulated edge rounded. Upper arm-plates very broad and comparatively short, the breadth equal to about five times the length; the outer edge with a slight notch or emargination; many of the plates are irregularly broken into two or three pieces. Two arm-spines on the first plate; three on the second; four on the third; five on the fourth; seven on the fifth; eight on the sixth; nine on the seventh; ten on the eighth; and eleven on the succeeding ones, as far as the middle of the arms. These spines are closely crowded, appressed, mostly oblong, with blunt points, about two thirds as long as the breadth of the side arm-plates; the upper ones smaller and shorter; the lowest one larger and stouter than the rest.

Color of the disk uniform yellowish brown in the dry specimen, arms, above, brownish yellow with an orange tinge, thickly covered with small, round, purplish brown spots, some of which occur also on the upper arm-spines and upper part of the side arm-plates. Lower surface uniform dull yellow.

Radius of disk .80 inch; length of arms from centre of disk 7.25 to 8; breadth of arm at base .32; height .30; length of upper arm-plates .08; length of middle arm-spines .05; length of third under arm-plate .07; breadth .09; length of tenth .07; breadth .08; length of mouth-shield .16; breadth .21; length of second mouth-papilla .06; breadth .08.

New Zealand; Chas. Cheever, 1848. (Coll. Essex Institute).

Ophionereis porrecta Lyman.

Catalogue of Ophiuridæ and Astropht. of Mus. of Comp. Zoölogy, p. 147, 1865.

Ophionereis crassispina Ljungman, Ophiuroidea Viventia, Öfv. Kongl. Vet.-Akad. Förhandl., 1866, p. 311.

Through the courtesy of Mr. Lyman I have been able to compare one of his original specimens with several in the Museum of Yale College, dredged at Maui, by Dr. C. Pickering. They agree perfectly in all respects, so that there can be no doubt but that its true locality is the Hawaiian Islands. It was doubtfully given as a Florida species by Mr. Lyman.

Ljungman's description of *O. crassispina* agrees perfectly with our specimens of the same size (disk 8 mm. in diameter). His specimens were from Honolulu.

O. squamata Ljung., from the same locality, appears from the description to differ but slightly, except in size (disk 13 mm. in diameter), and may well prove to be only the mature form of the same species.

Hemipholis gracilis Verrill.

Trans. Conn. Acad., I, p. 262 (read Jan., 1867, published March, 1867).

Hemipholis affinis Ljung., op. cit., p. 322 (read Nov. 1866, published 1867, note on fly-leaf dated May 18, 1867).

Ljungman's species, from Guayaquil, appears to be identical with *H. gracilis*. Judging from the date of Prof. Lóven's note, our name has priority of actual publication.

Ophiothela Danæ Verrill, sp. nov.

A small, slender species, with six long arms, strongly granulous above, and twelve large, prominent radial shields, which occupy the whole of the disk, except a small central area.

Disk somewhat star-shaped, with six rounded, emarginate angles, formed by the radial shields; and concave sides, in the interbrachial regions; the small central area depressed, the radial shields elevated; both the central area and radial shields bearing small, rounded, scattered granules, which are often wanting in the dry specimens. Radial shields very convex, in contact along the whole length, except at the outer end, where they are very slightly separated, leaving a notch between; each pair usually have a broad oval, or slightly cordate, form; in the largest specimens more elongated, the outer end more acute, with an angle at the point where they meet the adjacent shields in the interradial region; their surface, seen under a lens, is minutely roughened with rounded elevations, and usually bears some rounded, scattered granules. The arms are covered above with scattered, unequal, prominent granules, the central series largest; the plates are concealed by a continuous thin skin. Beneath, the plates around the mouth are united so as to form a continuous ring around it, and are entirely covered with a thin skin. The mouth-shields are small, the visible part squarish. The jaws are naked and conspicuous, without mouth-papillæ, but with numerous small teeth. Side arm-plates prominent, bearing about five small, rough spines, the lower ones shortest, bent downward, and bearing sharp spinules on the lower side, which serve as hooks for adhesion.

Color yellowish white with blotches of dark greenish, centre often dark; arms yellowish white crossed by bands of dark green at irregular distances. Diameter of disk of largest specimens .18 to .20 inch; length of arms about 1 inch.

Feejee Islands, in large numbers on *Melitodes virgata* Verrill (*Melitæa ochracea* Dana); J. D. Dana.